



# LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA22 | Whittington to Handsacre

**Data appendix (AQ-001-022)**

Air quality

November 2013

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# Department for Transport

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# Appendix AQ-001-022

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# 1 Introduction

1.1.1 The air quality appendices for the Whittington to Handsacre community forum area (CFA22) comprise:

- discussion of the policy framework (Section 2);
- baseline air quality data (Section 3);
- dust impact evaluation and risk rating (Section 4); and
- air quality assessment – road traffic (Section 5).

1.1.2 Maps referred to throughout the air quality appendix are contained in the Volume 5 air quality map book.

## 2 Policy framework

- 2.1.1 Staffordshire County Council's (SCC) Local Transport Plan (2011)<sup>1</sup> outlines a number of initiatives that are aimed at reducing emissions from road transport, including the promotion of alternatives to private motor vehicles (Policy 5.1) and the promotion of low-emitting vehicles and vehicle efficiency (Policy 5.2).
- 2.1.2 The local planning authority for the Whittington to Handsacre area is Lichfield District Council (LDC) and the relevant adopted local plan for the Whittington to Handsacre area is the Lichfield District Local Plan 1998<sup>2</sup>.
- 2.1.3 The Lichfield District Local Plan sets out the Council's policies and proposals for development and land use.
- 2.1.4 Policy DC.1 of the Lichfield District Local Plan: Amenity and Design Principles for Development, states that all new development "should not cause loss of amenity to adjacent properties or the neighbourhood through dust, fumes or other disturbance". "Traffic resulting from the development should not result in problems or increases in existing problems of congestion on the local road network"<sup>3</sup>.
- 2.1.5 The Lichfield District Local Plan will ultimately be replaced by a new local plan. However, many of the policies currently contained within the Lichfield District Local Plan, including Policy DC.1, have been saved and will therefore remain in force until they are replaced by the emerging local plan.
- 2.1.6 A new proposed submission of the local plan was published by LDC in July 2012 and submitted to Government Office in March 2013<sup>4</sup>.
- 2.1.7 A number of policies in the proposed submission of the local plan make reference to air quality. Core Policy 3: Delivering Sustainable Development, highlights several issues that all new development should address in order to deliver sustainable development. Of particular relevance to air quality, the policy states that all development should protect the amenity of local residents, and reduce levels of pollution or contamination to air, land, soil or water.
- 2.1.8 Core Policy 5: Sustainable Transport, contains a commitment to reduce the impact of travel on the environment and improve air quality. Core Policy 10: Healthy and Safe Lifestyles, states that that LDC will ensure that "the current high standard of air quality in the District is monitored and maintained and, where possible, improved with no decline in standards being deemed acceptable as a result of new development"<sup>5</sup>.

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<sup>1</sup> Staffordshire County Council (2011), *Staffordshire Local Transport Plan 2011 – Strategy Plan*.

<sup>2</sup> Lichfield District Council (1998), *Lichfield District Local Plan* (adopted June 1998).

<sup>3</sup> Lichfield District Council (1998), *Lichfield District Local Plan* (adopted June 1998). P120.

<sup>4</sup> Lichfield District Council (2012), *Lichfield District Local Plan, Our Strategy – Proposed Submission July 2012*.

<sup>5</sup> Lichfield District Council (2012), *Lichfield District Local Plan, Our Strategy – Proposed Submission July 2012*. P67.

## 3 Baseline air quality data

### 3.1 Existing air quality

#### Local authority review and assessment information

3.1.1 Under Part IV of the Environment Act 1995, all local authorities are responsible for local air quality management (LAQM). Under the LAQM regime, a local authority is required to undertake regular review and assessment of local air quality, the findings of which are reviewed by the Department of Environment, Food and Rural Affairs (Defra) prior to publication. If an area is identified as being unlikely to achieve an air quality standard and there are sensitive receptors to be exposed over the relevant exposure period, then the local authority is required to designate an air quality management area (AQMA) and develop an air quality action plan (AQAP) to improve local air quality.

3.1.2 LDC has designated an AQMA at Muckley Corner which includes a roundabout on the A5 and some of the surrounding properties. The AQMA is not within the Whittington to Handsacre area.

#### Local air quality monitoring data

3.1.3 Monitoring sites within the Whittington to Handsacre area that are considered relevant for this assessment are shown in Volume 5: Map AQ-01-022. The following sections provide a summary of the recorded pollutant concentrations at these sites.

3.1.4 The pollutant concentrations can be compared to the air quality standards:

- $40\mu\text{g}/\text{m}^3$  as an annual mean for NO<sub>2</sub> and PM<sub>10</sub>;
- $200\mu\text{g}/\text{m}^3$  one-hour mean for NO<sub>2</sub> not to be exceeded more than 18 times a year (equivalent to the 99.8<sup>th</sup> percentile of the one-hour mean);
- $50\mu\text{g}/\text{m}^3$  24-hour mean for PM<sub>10</sub> not to be exceeded more than 35 times a year (equivalent to the 90.4<sup>th</sup> percentile of the 24-hour mean); and
- $25\mu\text{g}/\text{m}^3$  as an annual mean for PM<sub>2.5</sub>.

#### *Continuous monitoring*

3.1.5 There are currently no permanent continuous monitoring locations in operation within the Whittington to Handsacre area.

#### *Diffusion tubes*

3.1.6 This section summarises the results from the diffusion tube sites that are considered relevant for the assessment of air quality in the Whittington to Handsacre area.

3.1.7 LDC measures annual mean NO<sub>2</sub> concentrations using passive diffusion tubes at 22 locations across its administrative area.

3.1.8 Only one diffusion tube measurement site is located within the Whittington to Handsacre area. This is a roadside site on the A38 at Fradley, approximately 2.5 km east of the centre line of the Proposed Scheme. This location is not considered to be representative of background air quality conditions in the mostly rural setting of the

Proposed Scheme in the Whittington to Handsacre area; however, it would be representative of concentrations in the vicinity of where the Proposed Scheme crosses the A38.

3.1.9 Annual mean NO<sub>2</sub> diffusion tube measurements for the period 2008-2012 at the A38, Fradley are presented below in Table 1. The concentrations recorded in 2008, 2009, 2011 and 2012 were below the annual mean air quality standard, but there was an exceedance in 2010. There is no clear increasing or decreasing trend over the 2008-2012 period;

Table 1: Annual mean NO<sub>2</sub> concentrations recorded at diffusion tube monitoring sites<sup>6</sup>

Site	Coordinates	Annual mean NO <sub>2</sub> concentrations ( $\mu\text{g}/\text{m}^3$ )				
		2008	2009	2010	2011	2012
A38, Fradley	416295, 313186	39	34	40	35	37

## Background pollutant concentrations

3.1.10 Estimates of background air quality have been obtained from Defra for 2012 and future years (2017 and 2026)<sup>7</sup>. These data are estimated for 1km grid squares for nitrogen oxides (NOx), NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>. NO<sub>2</sub> annual mean concentrations ranged from 15 $\mu\text{g}/\text{m}^3$  to 22  $\mu\text{g}/\text{m}^3$  in 2012, PM<sub>10</sub> annual mean concentrations ranged from 15 $\mu\text{g}/\text{m}^3$  to 18 $\mu\text{g}/\text{m}^3$  in 2012 and PM<sub>2.5</sub> concentrations ranged from 10 $\mu\text{g}/\text{m}^3$  to 12 $\mu\text{g}/\text{m}^3$  in 2012. All average pollutant concentrations are less than the relevant air quality standards.

3.1.11 The diffusion tube site described previously is not considered to be representative of the predominantly rural area through which the Proposed Scheme would pass, although it will be representative of concentrations in the vicinity of where the Proposed Scheme crosses the A38. The background air quality maps produced by the Defra are considered to be a more appropriate source of baseline air quality conditions along the Proposed Scheme in the Whittington to Handsacre area. These maps indicate that the average background pollutant concentrations across the Whittington to Handsacre area are below the relevant air quality standards.

## Local emission sources

3.1.12 The main source of emissions of NOx and PM<sub>10</sub> in the Whittington to Handsacre area is road traffic on the A38, as well as the A51 Tamworth Road and the A515 Lichfield Road<sup>8</sup> which the Proposed Scheme would cross. There are no permitted Part A industrial processes<sup>9</sup>.

<sup>6</sup> Notes for Table 1: Air quality standard for NO<sub>2</sub> is 40  $\mu\text{g}/\text{m}^3$  expressed as an annual mean.

<sup>7</sup> Department for Environment, Food and Rural Affairs; Background Maps; <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>; accessed: July 2013.

<sup>8</sup> Lichfield District Council (2011), 2011 Air Quality Progress Report for Lichfield District Council.

<sup>9</sup> Environment Agency; What's in your backyard website; <http://www.environment-agency.gov.uk/default.aspx>; accessed July 2013. A Part A process is an industrial operation requiring a permit to operate from the Environment Agency under the Environmental Permitting regime, and as such is considered a significant source of emissions.

## 3.2 Receptors

### Human

3.2.1 Human receptors which are considered to be susceptible to changes in air quality due to construction or operation of the proposed scheme have been identified.

#### *Construction phase*

3.2.2 Human receptors that could potentially be affected by the construction phase of the Proposed Scheme are shown in Volume 5: Map AQ-02-022-01, Map AQ-02-022-02, Map AQ-02-022-03 and Map AQ-02-022-04 for receptors relevant to the construction dust assessment and Volume 5: Map AQ-01-022 for receptors relevant to the construction traffic emissions assessment. These include:

- properties along Darnford Lane, west of Whittington;
- Fulfen Cottages, Capper's Lane, east of Lichfield;
- Mill Farm, Cappers Lane, east of Lichfield;
- property on Broad Lane, Huddlesford;
- properties around Ash Tree Lane, Streethay;
- Streethay Farm, Burton Road, east of Streethay;
- The Manor House, Burton Road, north-east of Streethay;
- Wood End Lock Cottage, Wood End Lane, Fradley;
- properties around Wood End Farm, Wood End Lane, Curborough;
- Ravenshaw Cottage, Wood End Lane, Curborough;
- properties along Shaw Lane, Hanch;
- Ashton Hayes Farm, Tuppenhurst Lane, south-east of Handsacre;
- Chestnut Close, Handsacre; and
- Hayes Meadow Primary School, Spode Avenue, Handsacre, Rugeley.

#### *Operational phase*

3.2.3 Human receptors that could potentially be affected by the operation of the Proposed Scheme are shown in Volume 5: Map AQ-01-022. These include:

- properties along Darnford Lane, west of Whittington, owing to permanent realignment of Darnford Lane associated with the Proposed Scheme.

### Ecological

#### *Construction phase*

3.2.4 No statutory designated ecological receptors that could potentially be affected by the construction of the Proposed Scheme have been identified within the Whittington to Handsacre area. There are nine non-statutory designated sites within the Whittington to Handsacre area that could potentially be affected by changes in air quality as a

result of construction of the Proposed Scheme. These are all sites with local wildlife site (LWS) status. These sites are:

- Whittington Heath Golf Course Site of Biological Importance (SBI), north of the A51 Tamworth Road;
- Big Lyntus SBI, south of Wood End Lane, Curborough;
- Fradley Wood Biological Alert Site (BAS), north of Wood End Lane, Fradley;
- Wood End Lock (south-east of) SBI, north of Wood End Lane, Curborough;
- Ravenshaw Wood, Black Slough and Slaish SBI, north of Wood End Lane, Curborough;
- Tomhay Wood SBI, between the West Coast Main Line and Wood End Lane;
- Vicar's Coppice BAS, adjacent to the A515 Lichfield Road;
- John's Gorse SBI, west of the A515; and
- Tuppenhurst Lane (west of) SBI, south-west of Tuppenhurst Lane.

### *Operational phase*

3.2.5 No statutory or non-statutory designated ecological receptors that could potentially be affected by the operation of the Proposed Scheme have been identified within the Whittington to Handsacre area.

## 4 Dust impact evaluation and risk rating

4.1.1 The following tables provide details of the assessment of construction impacts following the Institute of Air Quality Management (IAQM) guidance<sup>10</sup>. Where considered useful to identify receptors and their relationship to the construction activity a specific figure is provided.

4.1.2 The construction activities considered were demolition; construction of the Streethay construction sidings; the construction of new structures; earthworks, including the movement of materials on the haul road along the line of the Proposed Scheme; and dust and mud deposited onto public highways from vehicles travelling to and from construction areas (referred to as trackout in the IAQM guidance).

Table 2: Evaluation and risk rating of construction activities

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
<b>Properties along Darnford Lane, west of Whittington (Map-AQ-02-022-01 Figure 22.1, Figure 22.2 and Figure 22.3)</b>						
Demolition	20m-100m	Large	High	Low	Negligible	Properties more than 20m from demolition Total volume of demolition greater than 50,000m <sup>3</sup> Baseline PM <sub>10</sub> concentrations less than 75% of air quality standard Duration of demolition expected to be more than 12 months
Earthworks	20m-50m	Large	High	Low	Negligible	Properties more than 20m from earthworks and haul road Total area of earthworks greater than 10,000m <sup>2</sup> More than 10 heavy earth moving vehicles on haul road Baseline PM <sub>10</sub> concentrations less than 75% of air quality standard Duration of earthworks expected to be more than 12 months

<sup>10</sup> IAQM (2012), *Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance*.

Appendix AQ-001-022 | Dust impact evaluation and risk rating

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Construction	20m-50m	Large	High	Low	Negligible	<p>Properties more than 20m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m
<b>Mill Farm, Capers's Lane, east of Streethay(Map-AQ-02-022-01 Figure 22.4)</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	50m-100m	Large	Medium	Low	Negligible	<p>Property more than 20m from earthworks and over 100m from haul road</p> <p>Total area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles on haul road</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of earthworks expected to be more than 12 months</p>
Construction	50m-100m	Large	Medium	Low	Negligible	<p>Property more than 20m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	20m-50m	Large	Medium	High	Negligible	<p>Property 21m from trackout</p> <p>Over 100 HDV trips per day</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of trackout expected to be more than 12 months</p>
<b>Fulfen Cottages, Capers's Lane, east of Streethay(Map-AQ-02-022-02 Figure 22.5)</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Earthworks	20m-50m	Large	High	Low	Negligible	<p>Properties more than 100m from earthworks and 40m from haul road</p> <p>Total area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles on haul road</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of earthworks expected to be more than 12 months</p>
Construction	100m-200m	Large	Medium	Low	Negligible	<p>Properties more than 200m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	Less than 20m	Large	High	High	Slight adverse	<p>Properties 12m from trackout</p> <p>Over 100 HDV trips per day</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of trackout expected to be more than 12 months</p>
<b>Property on Broad Lane, Huddlesford (Map-AQ-02-022-02 Figure 22.6)</b>						
Demolition	20m-100m	Large	High	Low	Negligible	<p>Property more than 20m from demolition</p> <p>Total volume of demolition greater than 50,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of demolition expected to be more than 12 months</p>

Appendix AQ-001-022 | Dust impact evaluation and risk rating

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Earthworks	20m-50m	Large	High	Low	Negligible	<p>Property more than 20m from earthworks and haul road</p> <p>Total area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles on haul road</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of earthworks expected to be more than 12 months</p>
Construction	50m-100m	Large	Medium	Low	Negligible	<p>Property more than 20m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	Less than 20m	Large	High	High	Slight adverse	<p>Property 12m from trackout</p> <p>Over 100 HDV trips per day</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of trackout expected to be more than 12 months</p>
<b>Properties on Ash Tree Lane, Streethay (Map-AQ-02-022-02 Figure 22.7)</b>						
Demolition	200m-350m	Medium	Low	Low	Negligible	<p>Properties more than 200m from demolition (demolitions are over 200m to the south-east of properties and not shown in the map view)</p> <p>Total volume of demolition 20,000-50,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of demolition expected to be more than 12 months</p>

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Earthworks	50m-100m	Large	Medium	Low	Negligible	<p>Properties more than 20m from earthworks and more than 200m from haul road</p> <p>Total area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles on haul road</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of earthworks expected to be more than 12 months</p>
Construction	50m-100m	Large	Medium	Low	Negligible	<p>Properties more than 20m from construction and more than 20m from Streethay construction sidings</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	20m-50m	Large	Medium	Low	Negligible	<p>Properties more than 20m from trackout</p> <p>Over 100 HDV trips per day</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of trackout expected to be more than 12 months</p>

**Streethay Farm, Burton Road, north-east of Streethay (Map-AQ-02-022-02 Figure 22.8)**

Demolition	20m-100m	Medium	Medium	Low	Negligible	<p>Property more than 20m from demolition</p> <p>Total volume of demolition 20,000-50,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of demolition expected to be more than 12 months</p>
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Appendix AQ-001-022 | Dust impact evaluation and risk rating

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Earthworks	100m-200m	Large	Medium	Low	Negligible	<p>Property more than 100m from earthworks and haul road over 200m</p> <p>Total site area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles on haul road</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of earthworks expected more than 12 months</p>
Construction	50m-100m	Large	Medium	Low	Negligible	<p>Property more than 20m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	50m-100m	Large	Low	Low	Negligible	<p>Property more than 20m from trackout</p> <p>Over 100 HDV trips per day</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of trackout expected to be more than 12 months</p>
<b>The Manor, Burton Road, north-east of Streethay (Map-AQ-02-022-02 Figure 22.8)</b>						
Demolition	20m-100m	Large	High	Low	Negligible	<p>Property more than 20m from demolition</p> <p>Total volume of demolition greater than 50,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of demolition expected more than 12 months</p>

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Earthworks	20m-50m	Large	High	Low	Negligible	<p>Property more than 20m from earthworks and haul road</p> <p>Total area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles on haul road</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of earthworks expected to be more than 12 months</p>
Construction	20m-50m	Large	High	Low	Negligible	<p>Property more than 20m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m

**Properties around Wood End Farm, Wood End Lane, Curborough (Map-AQ-02-022-03 Figure 22.9)**

Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	n/a	n/a	n/a	n/a	n/a	No earthworks or haul road within 350m
Construction	n/a	n/a	n/a	n/a	n/a	No construction within 350m
Trackout	Less than 20m	Large	High	High	Slight adverse	<p>Properties 2m from trackout</p> <p>Over 100 HDV trips per day</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of trackout expected to be more than 12 months</p>

**Wood End Lock Cottage, Wood End Lane, Curborough (Map-AQ-02-022-03 Figure 22.10)**

Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
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Appendix AQ-001-022 | Dust impact evaluation and risk rating

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Earthworks	50m-100m	Large	Medium	Low	Negligible	<p>Property more than 50m from earthworks and haul road</p> <p>Total site area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles on haul road</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of earthworks expected more than 12 months</p>
Construction	Less than 20m	Large	High	High	Slight adverse	<p>Property 18m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m

Ravenshaw Cottage, Wood End Lane, Curborough (Map-AQ-02-022-03 Figure 22.11)

Demolition	20m-100m	Large	High	Low	Negligible	<p>Property more than 20m from demolition</p> <p>Total volume of demolition greater than 50,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of demolition expected to be more than 12 months</p>
Earthworks	20m-50m	Large	High	Low	Negligible	<p>Property more than 20m from earthworks and haul road</p> <p>Total site area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles on haul road</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of earthworks expected to be more than 12 months</p>

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Construction	20m-50m	Large	High	Low	Negligible	<p>Property more than 20m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m
<b>The Elms, Shaw Lane, Hanch (Map-AQ-02-022-03 Figure 22.12)</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	n/a	n/a	n/a	n/a	n/a	No earthworks or haul road within 350m
Construction	n/a	n/a	n/a	n/a	n/a	No construction within 350m
Trackout	Less than 20m	Medium	Medium	High	Negligible	<p>Property 8m from trackout</p> <p>25-100 HDV trips per day</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of trackout expected to be more than 12 months</p>
<b>Shaw Lane Farm, Shaw Lane, Hanch (Map-AQ-02-022-04 Figure 22.13)</b>						
Demolition	100m-200m	Large	Medium	Low	Negligible	<p>Properties more than 100m from demolition</p> <p>Total volume of demolition greater than 50,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of demolition expected to be more than 12 months</p>

Appendix AQ-001-022 | Dust impact evaluation and risk rating

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Earthworks	Less than 20m	Large	High	High	Slight adverse	<p>Properties 10m from earthworks and 100m from haul road</p> <p>Total site area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles on haul road</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of earthworks expected to be more than 12 months</p>
Construction	100m-200m	Large	Medium	Low	Negligible	<p>Properties more than 20m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	Less than 20m	Medium	Medium	High	Negligible	<p>Properties 8m from trackout</p> <p>25-100 HDV trips per day</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of trackout expected to be more than 12 months</p>
<b>Ashton Hayes Farm, Tuppenhurst Lane, south-east of Handsacre (Map-AQ-02-022-04 Figure 22.14)</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	20m-50m	Large	High	Low	Negligible	<p>Property more than 20m from earthworks and haul road</p> <p>Total site area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles on haul road</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of earthworks expected to be more than 12 months</p>

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Construction	Less than 20m	Large	High	High	Slight adverse	<p>Property 10m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m
<b>Chestnut Close, Handsacre (Map-AQ-02-022-04 Figure 22.15)</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	20m-50m	Large	High	Low	Negligible	<p>Properties more than 20m from earthworks and haul road</p> <p>Total site area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles on haul road</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of earthworks expected to be more than 12 months</p>
Construction	20m-50m	Large	High	Low	Negligible	<p>Properties more than 20m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m
<b>Hayes Meadow Primary School (Map-AQ-02-022-04 Figure 22.16)</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	n/a	n/a	n/a	n/a	n/a	No earthworks or haul road within 350m

Appendix AQ-001-022 | Dust impact evaluation and risk rating

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Construction	Less than 20m	Large	High	High	Slight adverse	<p>School building 10m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m
<b>Whittington Heath Golf Course SBI</b>						
Demolition	20m-100m	Large	Medium	Medium	Negligible	<p>Locally important ecological site</p> <p>Ecological receptor less than 20m from demolition</p> <p>Total volume of demolition greater than 50,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of demolition expected more than 12 months</p>
Earthworks	Less than 20m	Large	Medium	Medium	Negligible	<p>Locally important ecological site</p> <p>Ecological receptor less than 20m from construction and haul road</p> <p>Total site area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles n haul road</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Construction	Less than 20m	Large	Medium	Medium	Negligible	<p>Locally important ecological site</p> <p>Ecological receptor less than 20m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Trackout	Less than 20m	Medium	Medium	Medium	Negligible	<p>Locally important ecological site</p> <p>Ecological receptor less than 20m from trackout</p> <p>25-100 HDV trips per day</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of trackout expected to be more than 12 months</p>
<b>Big Lyntus SBI</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	Less than 20m	Large	Medium	Medium	Negligible	<p>Locally important ecological site</p> <p>Ecological receptor less than 20m from construction and over 100m from haul road</p> <p>Total site area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles n haul road</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Construction	Less than 20m	Large	Medium	Medium	Negligible	<p>Locally important ecological site</p> <p>Ecological receptor less than 20m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>

Appendix AQ-001-022 | Dust impact evaluation and risk rating

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Trackout	Less than 20m	Medium	Medium	Medium	Negligible	<p>Locally important ecological site</p> <p>Ecological receptor less than 20m from trackout</p> <p>25-100 HDV trips per day</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of trackout expected to be more than 12 months</p>
<b>Fradley Wood BAS</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	Less than 20m	Large	Medium	Medium	Negligible	<p>Locally important ecological site</p> <p>Ecological receptor less than 20m from construction and over 100m from haul road</p> <p>Total site area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles n haul road</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Construction	Less than 20m	Large	Medium	Medium	Negligible	<p>Locally important ecological site</p> <p>Ecological receptor less than 20m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m
<b>Wood End Lock (south-east of) SBI</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Earthworks	Less than 20m	Large	Medium	Medium	Negligible	<p>Locally important ecological site</p> <p>Ecological receptor less than 20m from construction and haul road</p> <p>Total site area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles n haul road</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Construction	Less than 20m	Large	Medium	Medium	Negligible	<p>Locally important ecological site</p> <p>Ecological receptor less than 20m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	Less than 20m	Medium	Medium	Medium	Negligible	<p>Locally important ecological site</p> <p>Ecological receptor less than 20m from trackout</p> <p>25-100 HDV trips per day</p> <p>Baseline PM10 concentrations less than 75% of air quality standard</p> <p>Duration of trackout expected to be more than 12 months</p>
<b>Ravenshaw Wood, Black Slough and Slaish SBI</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m

Appendix AQ-001-022 | Dust impact evaluation and risk rating

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Earthworks	Less than 20m	Large	Medium	Medium	Negligible	Locally important ecological site Ecological receptor less than 20m from construction and haul road Total site area of earthworks greater than 10,000m <sup>2</sup> More than 10 heavy earth moving vehicles n haul road Baseline PM10 concentrations less than 75% of air quality standard Duration of construction expected to be more than 12 months
Construction	Less than 20m	Large	Medium	Medium	Negligible	Locally important ecological site Ecological receptor less than 20m from construction Total volume of construction greater than 100,000m <sup>3</sup> Baseline PM10 concentrations less than 75% of air quality standard Duration of construction expected to be more than 12 months
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m
<b>Tomhay Wood SBI</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Construction	Less than 20m	Large	Medium	Medium	Negligible	Locally important ecological site Ecological receptor less than 20m from construction Total volume of construction greater than 100,000m <sup>3</sup> Baseline PM10 concentrations less than 75% of air quality standard Duration of construction expected to be more than 12 months
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
<b>Vicar's Coppice BAS</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	20m-40m	Large	Medium	Medium	Negligible	Locally important ecological site Ecological receptor more than 20m from construction and haul road Total site area of earthworks greater than 10,000m <sup>2</sup> More than 10 heavy earth moving vehicles n haul road Baseline PM10 concentrations less than 75% of air quality standard Duration of construction expected to be more than 12 months
Construction	20m-40m	Large	Medium	Medium	Negligible	Locally important ecological site Ecological receptor more than 20m from construction Total volume of construction greater than 100,000m <sup>3</sup> Baseline PM10 concentrations less than 75% of air quality standard Duration of construction expected to be more than 12 months
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m
<b>John's Gorse SBI</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	Less than 20m	Large	Medium	Medium	Negligible	Locally important ecological site Ecological receptor less than 20m from construction and haul road Total site area of earthworks greater than 10,000m <sup>2</sup> More than 10 heavy earth moving vehicles n haul road Baseline PM10 concentrations less than 75% of air quality standard Duration of construction expected to be more than 12 months

Appendix AQ-001-022 | Dust impact evaluation and risk rating

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Construction	Less than 20m	Large	Medium	Medium	Negligible	Locally important ecological site Ecological receptor less than 20m from construction Total volume of construction greater than 100,000m <sup>3</sup> Baseline PM10 concentrations less than 75% of air quality standard Duration of construction expected to be more than 12 months
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m
<b>Tuppenhurst Lane (west of) SBI</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	Less than 20m	Large	Medium	Medium	Negligible	Locally important ecological site Ecological receptor less than 20m from construction and haul road Total site area of earthworks greater than 10,000m <sup>2</sup> More than 10 heavy earth moving vehicles n haul road Baseline PM10 concentrations less than 75% of air quality standard Duration of construction expected to be more than 12 months
Construction	Less than 20m	Large	Medium	Medium	Negligible	Locally important ecological site Ecological receptor less than 20m from construction Total volume of construction greater than 100,000m <sup>3</sup> Baseline PM10 concentrations less than 75% of air quality standard Duration of construction expected to be more than 12 months
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m

Table 3: Summary of construction dust impacts and effects

<b>Location</b>	<b>Magnitude of impact (with CoCP mitigation measures)</b>	<b>Effect of dust- generating activities</b>	<b>Additional Mitigation</b>
Properties along Darnford Lane, west of Whittington	Negligible	Not significant	None required
Mill Farm, Capers's Lane, east of Lichfield	Negligible	Not significant	None required
Fulfen Cottages, Capers's Lane, east of Lichfield	Slight Adverse	Not significant	None required
Property on Broad Lane, Huddlesford	Slight Adverse	Not significant	None required
Properties on Ash Tree Lane, Streethay	Negligible	Not significant	None required
Streethay Farm, Burton Road, north-east of Streethay	Negligible	Not significant	None required
The Manor, Burton Road, north-east of Streethay	Negligible	Not significant	None required
Properties around Wood End Farm, Wood End Lane, Curborough	Slight Adverse	Not significant	None required
Wood End Lock Cottage, Wood End Lane, Fradley	Slight Adverse	Not significant	None required
Ravenshaw Cottage, Wood End Lane, Curborough	Negligible	Not significant	None required
The Elms, Shaw Lane, Handsacre	Negligible	Not significant	None required
Shaw Lane Farm, Shaw Lane, Handsacre	Slight Adverse	Not significant	None required
Ashton Hayes Farm, Tuppenhurst Lane, south-east of Handsacre	Slight Adverse	Not significant	None required
Chestnut Close, Handsacre	Negligible	Not significant	None required
Hayes Meadow Primary School	Slight Adverse	Not significant	None required
Whittington Heath Golf Course SBI	Negligible	Not significant	None required
Big Lyntus SBI	Negligible	Not significant	None required
Fradley Wood BAS	Negligible	Not significant	None required
Wood End Lock (south-east of) SBI	Negligible	Not significant	None required
Ravenshaw Wood, Black Slough and Slaish SBI	Negligible	Not significant	None required
Tomhay Wood SBI	Negligible	Not significant	None required
Vicar's Coppice BAS	Negligible	Not significant	None required
John's Gorse SBI	Negligible	Not significant	None required
Tuppenhurst Lane (west of) SBI	Negligible	Not significant	None required

## 5 Air quality assessment road traffic

### 5.1 Overall assessment approach

5.1.1 The air quality assessment for road related emissions has used three different approaches based on the scale of changes in traffic and road alignment. Where the Design Manual for Roads and Bridges (DMRB) thresholds detailed in the SMR (Volume 5: Appendix CT-001-000/1) will not be exceeded, any additional assessment is not required as the air quality impacts will be minimal. If these thresholds are breached, then an assessment has been carried out.

5.1.2 If it is considered unlikely that air quality standards will be exceeded and the road configuration is a simple one, then the DMRB screening method has been used to predict changes in air quality. Where there will be a risk of standards being exceeded, where the road layout is considered to be complex or where the use of the DMRB screening method has indicated that there will be a potential exceedance of air quality standards, then the atmospheric dispersion model ADMS-Roads has been used for the assessment. Professional judgment has been used to select the appropriate tool for each area.

5.1.3 In this study area the DMRB screening method was considered to be a suitable tool for the assessment as baseline air quality will be below air quality standards, there is a simple road layout and there are limited numbers of receptors close to roads affected during construction and operation of the Proposed Scheme.

### 5.2 Construction traffic model

5.2.1 Construction traffic data used in this assessment are detailed in Volume 5: Appendix TR-001-000. The construction scenario used traffic data from the year of maximum intensity of construction (2021) but assumed this would occur in the first year of construction (2017).

5.2.2 Screening using the DMRB traffic and road alignment change criteria was undertaken to determine locations requiring assessment. Three locations within the Whittington to Handsacre area met the criteria for assessment of change in traffic emissions during the construction phase. These locations are Cappers Lane, east of Lichfield; Broad Lane, Huddlesford and the A38 in Streethay. At all of these locations, the increase in construction traffic was sufficient to require an assessment. At Broad Lane there will also be a temporary road realignment which required assessment. No locations were identified as requiring assessment due to construction traffic movements on the haul road.

### Receptors assessed

5.2.3 For locations where DMRB traffic and road alignment change criteria for local air quality were met, a number of receptors representative of worst-case exposure locations were selected for quantitative assessment. These included locations representative of highest concentrations along the roads, including closest to junctions or to the road itself. Receptors assessed are listed in Table 4 and shown in Volume 5: Map AQ-01-022.

Table 4: Modelled receptors (construction phase)

<b>Receptor</b>	<b>Description/Location</b>	<b>Ordnance Survey coordinates</b>
22-1	2 Freeford Bridge, Tamworth Road, Lichfield (along A38)	413442,308274
22-2	1 Freeford Bridge, Tamworth Road, Lichfield (along A38)	413453,308278
22-3	3 Mallets Corner, Tamworth Road, Lichfield (along A38)	413178,308355
22-4	Mill Farm, Cappers Lane, Lichfield	414854,309065
22-5	Brook House, Cappers Lane, Lichfield	414918,309101
22-6	West Farm House, Cappers Lane, Lichfield	414050,309201
22-7	1 Fulfen Cottages, Cappers Lane, Lichfield	414518,309207
22-8	New Fulfen Cottage, Cappers Lane, Lichfield	414322,309218
22-9	Ivy Cottage, Broad Lane, Huddlesford	414652,309427
22-10	Poplars, Ash Tree Lane, Lichfield	414284,310357
22-11	9 Ash Tree Lane, Lichfield	414312,310411
22-12	141 Burton Road, Streethay, Lichfield	414247,310471
22-13	Streethay Farm, Burton, Streethay, Lichfield	414578,310795
22-14	The Manor, Burton Road, Streethay, Lichfield	414371,310835

## Background concentrations

5.2.4 The background concentrations used in the assessment are shown in Table 5 taken from the Defra Maps.

Table 5: Background 2017 concentrations at assessed receptors

<b>Receptor (or zone of receptors)</b>	<b>Concentrations (<math>\mu\text{g}/\text{m}^3</math>)</b>		
	<b>NOx</b>	<b>NO<sub>2</sub></b>	<b>PM<sub>10</sub></b>
22-1 (2 Freeford Bridge)	24.6	17.0	16.8
22-2 (1 Freeford Bridge)	24.6	17.0	16.8
22-3 (3 Mallets Corner)	24.6	17.0	16.8
22-4 (Mill Farm)	21.8	15.2	15.9
22-5 (Brook House)	21.8	15.2	15.9
22-6 (West Farm House)	21.8	15.2	15.9
22-7 (1 Fulfen Cottages)	21.8	15.2	15.9
22-8 (New Fulfen Cottage)	21.8	15.2	15.9
22-9 (Ivy Cottage)	21.8	15.2	15.9
22-10 (Poplars)	21.3	15.0	16.5
22-11 (9 Ash Tree)	21.3	15.0	16.5
22-12 (141 Burton Road)	21.3	15.0	16.5
22-13 (Streethay Farm)	21.3	15.0	16.5

Receptor (or zone of receptors)	Concentrations ( $\mu\text{g}/\text{m}^3$ )		
	NOx	NO2	PM10
22-14 (The Manor)	21.3	15.0	16.5

## DMRB model results

5.2.5 This section provides the summary of the modelled pollutant concentrations for the assessed receptors. The magnitude of change and impact descriptor are also derived following the Environmental Protection UK (EPUK) methodology<sup>11</sup>.

Table 6: Summary of DMRB annual mean NO2 results (construction phase)

Receptor	Concentrations ( $\mu\text{g}/\text{m}^3$ )			Change in concentrations ( $\mu\text{g}/\text{m}^3$ )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
22-1 (2 Freeford Bridge)	22.7	17.8	18.0	0.2	Imperceptible	Negligible
22-2 (1 Freeford Bridge)	22.6	17.8	17.9	0.1	Imperceptible	Negligible
22-3 (3 Mallets Corner)	24.3	19.1	19.6	0.5	Small increase	Negligible
22-4 (Mill Farm)	19.2	15.6	16.3	0.7	Small increase	Negligible
22-5 (Brook House)	19.6	15.9	17.4	1.5	Small increase	Negligible
22-6 (West Farm House)	20.1	16.3	16.4	0.1	Imperceptible	Negligible
22-7 (1 Fulfen Cottages)	19.8	16.1	17.9	1.8	Small increase	Negligible
22-8 (New Fulfen Cottage)	18.9	15.3	15.5	0.2	Imperceptible	Negligible
22-9 (Ivy Cottage)	19.2	15.6	19.6	4.0	Large increase	Slight adverse
22-10 (Poplars)	28.4	22.8	23.9	1.1	Small increase	Negligible
22-11 (9 Ash Tree)	30.9	25.1	26.4	1.3	Small increase	Negligible
22-12 (141 Burton Road)	24.8	20.2	20.2	0.0	Imperceptible	Negligible
22-13 (Streethay Farm)	32.3	26.1	27.7	1.6	Small Increase	Negligible
22-14 (The Manor)	20.0	15.7	15.8	0.1	Imperceptible	Negligible

Table 7: Summary of DMRB annual mean PM10 results (construction phase)

Receptor	Concentrations ( $\mu\text{g}/\text{m}^3$ )			Change in concentrations ( $\mu\text{g}/\text{m}^3$ )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
22-1 (2 Freeford Bridge)	18.0	16.9	16.9	0.0	Imperceptible	Negligible
22-2 (1 Freeford Bridge)	17.9	16.9	16.9	0.0	Imperceptible	Negligible
22-3 (3 Mallets Corner)	18.2	17.1	17.2	0.1	Imperceptible	Negligible

<sup>11</sup> Environmental Protection UK (EPUK) (2010), *Development Control: Planning for Air Quality*.

Receptor	Concentrations ( $\mu\text{g}/\text{m}^3$ )			Change in concentrations ( $\mu\text{g}/\text{m}^3$ )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
22-4 (Mill Farm)	16.9	15.9	16.0	0.1	Imperceptible	Negligible
22-5 (Brook House)	16.9	16.0	16.1	0.1	Imperceptible	Negligible
22-6 (West Farm House)	17.0	16.1	16.1	0.0	Imperceptible	Negligible
22-7 (1 Fulfen Cottages)	17.0	16.1	16.2	0.1	Imperceptible	Negligible
22-8 (New Fulfen Cottage)	16.8	15.9	15.9	0.0	Imperceptible	Negligible
22-9 (Ivy Cottage)	16.9	15.9	16.3	0.4	Imperceptible	Negligible
22-10 (Poplars)	19.0	17.8	17.9	0.1	Imperceptible	Negligible
22-11 (9 Ash Tree)	19.5	18.2	18.3	0.1	Imperceptible	Negligible
22-12 (141 Burton Road)	18.4	17.4	17.4	0.0	Imperceptible	Negligible
22-13 (Streethay Farm)	19.8	18.4	18.5	0.1	Imperceptible	Negligible
22-14 (The Manor)	17.6	16.6	16.6	0.0	Imperceptible	Negligible

5.2.6 Annual mean NO<sub>2</sub> and PM<sub>10</sub> concentrations will be below the air quality standards both with and without the Proposed Scheme for the construction phase. The hourly mean NO<sub>2</sub> air quality standard will also be met as annual mean NO<sub>2</sub> concentrations will be well below 60 $\mu\text{g}/\text{m}^3$ . In addition the daily mean PM<sub>10</sub> air quality standard will also be met. It is not possible to model PM<sub>2.5</sub> using the DMRB screening model, but given the PM<sub>10</sub> concentrations, the annual mean PM<sub>2.5</sub> concentrations will be below the air quality standard.

5.2.7 Changes in modelled concentrations with and without the Proposed Scheme have been calculated to determine the impact to local air quality. For NO<sub>2</sub> there will be a large increase in concentrations at Ivy Cottage due to the increases in traffic on Broad Lane as a result of construction traffic movements. There will be a small increase at the receptors closest to the A38 and Capers Lane due to increases in traffic on these roads as a result of construction traffic movements. The change in PM<sub>10</sub> concentrations is imperceptible.

5.2.8 The magnitude of impact will be slight adverse for NO<sub>2</sub> at Ivy Cottage on Broad Lane due to the large increase in concentrations combined with the concentrations being well below air quality standards. The magnitude of impact for NO<sub>2</sub> will be negligible for all other receptors as the change in concentrations is imperceptible to small and concentrations are well below air quality standards. For PM<sub>10</sub> the magnitude of impact will be negligible for all receptors assessed as the change in concentrations is imperceptible and concentrations are well below air quality standards.

### Assessment of significance

5.2.9 Considering the significance of the air quality impacts according to the criteria set in the EPUK methodology<sup>11</sup>, the following points are noted:

- the magnitude of impact is negligible or slight adverse for NO<sub>2</sub> and PM<sub>10</sub> at receptors; and

- pollutant concentrations are well below the air quality standards for both NO<sub>2</sub> and PM<sub>10</sub> with and without the Proposed Scheme.

5.2.10 Based on the above, the effect on air quality due to construction traffic emission will not be significant

## 5.3 Operational traffic model

5.3.1 Operational traffic data used in this assessment are detailed in Volume 5: Appendix TR-001-000. The operational scenario used traffic data from the first year of opening of the Proposed Scheme (2026).

5.3.2 Screening using the DMRB traffic and road alignment change criteria was undertaken to determine locations requiring assessment. One location within the Whittington to Handsacre area met the criteria for an assessment of emissions from traffic during the operational stage, following completion of the Proposed Scheme. This location is Darnford Lane, west of Whittington, due to permanent realignment of Darnford Lane.

### Receptors assessed

5.3.3 For locations where DMRB traffic and road alignment change criteria for local air quality were met, two receptors representative of worst-case exposure locations were selected for quantitative assessment. These included locations representative of highest concentrations along the roads, including closest to junctions or to the road itself. Receptors assessed are listed in Table 8 and shown in Volume 5: Map AQ-01-022.

Table 8: Modelled receptors (operational phase)

Receptor	Description/Location	Ordnance Survey coordinates
22-15	Whittington Hill Farm, Darnford Lane, Lichfield	414656, 308405
22-16	39 Darnford Lane, Lichfield	413568, 308836

### Background concentrations

5.3.4 The background concentrations used in the assessment are shown in Table 9 taken from the Defra maps.

Table 9: Background 2026 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations ( $\mu\text{g}/\text{m}^3$ )		
	NOx	NO <sub>2</sub>	PM <sub>10</sub>
22-15 (Whittington Hill Farm)	13.8	10.1	14.2
22-16 (39 Darnford Lane)	18.0	12.9	16.1

### DMRB model results

5.3.5 This section provides the summary of the modelled pollutant concentrations for the assessed receptors. The magnitude of change and impact descriptor is also derived following the EPUK methodology<sup>11</sup>.

Table 10: Summary of DMRB annual mean NO<sub>2</sub> results (operational phase)

Receptor	Concentrations ( $\mu\text{g}/\text{m}^3$ )		Change in concentrations ( $\mu\text{g}/\text{m}^3$ )	Magnitude of change	Impact descriptor
	2026 without Proposed Scheme	2026 with Proposed Scheme			
22-15 (Whittington Hill Farm)	10.1	10.1	0.0	Imperceptible	Negligible
22-16 (39 Darnford Lane)	15.4	15.4	0.0	Imperceptible	Negligible

Table 11: Summary of DMRB annual mean PM<sub>10</sub> results (operational phase)

Receptor	Concentrations ( $\mu\text{g}/\text{m}^3$ )		Change in concentrations ( $\mu\text{g}/\text{m}^3$ )	Magnitude of change	Impact descriptor
	2026 without Proposed Scheme	2026 with Proposed Scheme			
22-15 (Whittington Hill Farm)	14.2	14.2	0.0	Imperceptible	Negligible
22-16 (39 Darnford Lane)	16.6	16.6	0.0	Imperceptible	Negligible

5.3.6 Annual mean NO<sub>2</sub> and PM<sub>10</sub> concentrations will be below the air quality standards both with and without the Proposed Scheme for the operation phase. The hourly mean NO<sub>2</sub> air quality standard will also be met as annual mean NO<sub>2</sub> concentrations will be well below 60 $\mu\text{g}/\text{m}^3$ . In addition the daily mean PM<sub>10</sub> air quality standard will also be met. It is not possible to model PM<sub>2.5</sub> using the DMRB screening model, but given the PM<sub>10</sub> concentrations, the annual mean PM<sub>2.5</sub> concentrations will be below the air quality standard.

5.3.7 Changes in modelled concentrations with and without the Proposed Scheme have been calculated to determine the impact to local air quality. The change in NO<sub>2</sub> and PM<sub>10</sub> concentrations is imperceptible at all receptors.

### Assessment of significance

5.3.8 Considering the significance of the air quality impacts according to the criteria set in the EPUK methodology<sup>11</sup>, the following points are noted:

- the magnitude of impact is negligible for NO<sub>2</sub> and PM<sub>10</sub> at all receptors; and
- pollutant concentrations are well below the air quality standards for both NO<sub>2</sub> and PM<sub>10</sub> with and without the Proposed Scheme.

5.3.9 Based on the above, the effect on air quality due to operational traffic emissions will not be significant.

## 6 Air quality assessment construction phase rail emissions

- 6.1.1 The Streethay rail siding will be constructed and will be in use for the duration of the construction period. Screening was undertaken to determine the effect on air quality due to the use of diesel trains at the sidings. Screening is based on the baseline air quality and distance of receptors from diesel trains. It is not required for the number of train movements to be considered for the screening. Baseline concentrations of annual mean NO<sub>2</sub> are less than 25µg/m<sup>3</sup>, based on Defra background maps, and there are no human or ecological receptors within 30m of rail tracks used by diesel trains. On this basis the magnitude of impact will be negligible.
- 6.1.2 The effects on air quality anticipated to arise due to the Streethay rail sidings while in use during construction of the Proposed Scheme will not be significant.

## 7 References

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